

WHAT IS CLAIMED IS:

1. A semiconductor device comprising:
a semiconductor layer formed on an insulating surface, and having at least a source
5 region, a drain region, and a channel formation region interposed therebetween;
a first insulating film formed on said semiconductor layer;
at least one electrode formed on said first insulating film, and overlapping said
channel formation region;
a source wiring formed on said first insulating film;
10 a second insulating film covering at least said electrode and said source wiring;
and
a gate wiring formed on said second insulating film, and connected to said
electrode.
- 15 2. A semiconductor device according to claim 1, wherein said gate wiring overlaps
a portion of said semiconductor layer containing at least said channel formation region.
- 20 3. A semiconductor device according to claim 1, wherein said electrode comprises
a gate electrode.
- 25 4. A semiconductor device according to claim 1, wherein said electrode and said
source wiring comprise a same material.
5. A semiconductor device according to claim 1, wherein a material of said gate
wiring comprises one or a plurality of elements selected from the group consisting of poly-
Si, W, WSi_x, Al, Cu, Ta, Cr and Mo.
6. A semiconductor device according to claim 1, wherein said first insulating film
comprises a gate insulating film.

7. A semiconductor device according to claim 1, wherein said second insulating film further comprises a first insulating layer containing silicon as a main component and a second insulating layer containing an organic resin material.

5 8. A semiconductor device according to claim 1, wherein said semiconductor device is one selected from the group consisting of a personal computer, a video camera, a portable information terminal, a digital camera, a digital video disk player, and an electric game appliance.

10 9. A semiconductor device comprising:
a semiconductor layer formed on an insulating surface, and having at least a source region, a drain region, and a channel formation region interposed therebetween;
a first insulating film formed on said semiconductor layer;
at least one electrode formed on said first insulating film, and overlapping said
15 channel formation region;
a source wiring formed on said first insulating film;
a second insulating film covering at least said electrode and said source wiring;
a gate wiring formed on said second insulating film, and connected to said
electrode;
20 a connection electrode formed on said second insulating film, and connected to said
source wiring and said semiconductor layer; and
a pixel electrode formed on said second insulating film, and connected to said
semiconductor layer.

25 10. A semiconductor device according to claim 9, wherein said pixel electrode overlaps said source wiring.

11. A semiconductor device according to claim 9, wherein said gate wiring overlaps a portion of said semiconductor layer containing at least said channel formation region.

12. A semiconductor device according to claim 9, wherein said electrode comprises a gate electrode.

13. A semiconductor device according to claim 9, wherein said electrode and said 5 source wiring comprise a same material.

14. A semiconductor device according to claim 9, wherein said pixel electrode, said connection electrode and said gate wiring comprise a same material.

10 15. A semiconductor device according to claim 9, wherein a material of said gate wiring comprises one or a plurality of elements selected from the group consisting of poly-Si, W, WSi_x, Al, Cu, Ta, Cr and Mo.

15 16. A semiconductor device according to claim 9, wherein said first insulating film comprises a gate insulating film.

17. A semiconductor device according to claim 9, wherein said second insulating film further comprises a first insulating layer containing silicon as a main component and a second insulating layer containing an organic resin material.

20 18. A semiconductor device according to claim 9, wherein one pixel including said pixel electrode forms a storage capacitor between said semiconductor layer connected to said pixel electrode and said electrode connected to a gate wiring of an adjacent pixel, using said first insulating film as a dielectric.

25 19. A semiconductor device according to claim 9, wherein an impurity element for imparting a p-type conductivity is added to said semiconductor layer connected to said pixel electrode.

20. A semiconductor device according to claim 9, said semiconductor device is one selected from the group consisting of a personal computer, a video camera, a portable information terminal, a digital camera, a digital video disk player, and an electric game appliance.

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21. A semiconductor device comprising:

a first insulating film adjacent to a semiconductor layer, said semiconductor layer having at least a source region, a drain region, and a channel formation region interposed therebetween;

10 at least one electrode including a gate electrode formed on said first insulating film;

a source wiring formed on said first insulating film;

a second insulating film covering at least said electrode and said source wiring;

a gate wiring electrically connected to said electrode; and

15 a pixel electrode electrically connected to said semiconductor layer,

wherein said gate wiring and said pixel electrode are formed on said second insulating film.

22. A semiconductor device according to claim 21, wherein said gate wiring overlaps

20 a portion of said semiconductor layer containing at least said channel formation region.

23. A semiconductor device according to claim 21, wherein said electrode and said source wiring comprise a same material.

25 24. A semiconductor device according to claim 21, wherein a material of said gate wiring comprises one or a plurality of elements selected from the group consisting of poly-Si, W, WSi_x, Al, Cu, Ta, Cr and Mo.

25. A semiconductor device according to claim 21, wherein said first insulating film

comprises a gate insulating film.

26. A semiconductor device according to claim 21, wherein said second insulating film further comprises a first insulating layer containing silicon as a main component and
5 a second insulating layer containing an organic resin material.

27. A semiconductor device according to claim 21, wherein said semiconductor device is one selected from the group consisting of a personal computer, a video camera, a portable information terminal, a digital camera, a digital video disk player, and an electric
10 game appliance.

28. A semiconductor device comprising a pair of substrates and a liquid crystal interposed therebetween, one of said pair of substrates having at least a pixel portion and a driver circuit, said pixel portion comprising:

15 a semiconductor layer formed on an insulating surface, and having at least a source region, a drain region and a channel formation region interposed therebetween;

a first insulating film formed on said semiconductor layer;

20 at least one electrode formed on said first insulating film, and overlapping at least said channel formation region;

a source wiring formed on said first insulating film;

a second insulating film covering at least said electrode and said source wiring;

25 a gate wiring formed on said second insulating film, and connected to said electrode;

a connection electrode formed on said second insulating film, and connected to said source wiring and said semiconductor layer; and

a pixel electrode formed on said second insulating film, and connected to said semiconductor layer, and

wherein said other substrate comprises a light-shielding film in which a red color filter and a blue color filter are laminated so as to overlap said first semiconductor layer.

29. A semiconductor device according to claim 28, further comprising a common wiring on said second insulating film, wherein said pixel electrode and said common wiring are arranged so that an electric field substantially parallel to a surface of said substrate is generated.

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30. A semiconductor device according to claim 28, said semiconductor device is a reflection-type liquid crystal display device in which said pixel electrode comprises a film containing Al or Ag or a lamination film thereof.

10 31. A semiconductor device according to claim 28, said semiconductor device is a transmission-type liquid crystal display device in which said pixel electrode comprises a transparent electrically conductive film.

15 32. A semiconductor device according to claim 28, said semiconductor device is one selected from the group consisting of a personal computer, a video camera, a portable information terminal, a digital camera, a digital video disk player, and an electric game appliance.

20 33. A semiconductor device comprising a pair of substrates and a liquid crystal interposed therebetween, one of said pair of substrates having at least a pixel portion and a driver circuit, said pixel portion comprising:

25 a semiconductor layer formed on an insulating surface, and having at least a source region, a drain region and a channel formation region interposed therebetween;

 a first insulating film formed on said semiconductor layer;

 at least one electrode formed on said first insulating film, and overlapping at least said channel formation region;

 a source wiring formed on said first insulating film;

 a second insulating film covering at least said electrode and said source wiring;

 a gate wiring formed on said second insulating film, and connected to said electrode;

and

a pixel electrode formed on said second insulating film, and electrically connected to said semiconductor layer.

5 34. A semiconductor device according to claim 33, further comprising a common wiring on said second insulating film, wherein said pixel electrode and said common wiring are arranged so that an electric field substantially parallel to a surface of said substrate is generated.

10 35. A semiconductor device according to claim 33, said semiconductor device is a reflection-type liquid crystal display device in which said pixel electrode comprises a film containing Al or Ag or a lamination film thereof.

15 36. A semiconductor device according to claim 33, said semiconductor device is a transmission-type liquid crystal display device in which said pixel electrode comprises a transparent electrically conductive film.

20 37. A semiconductor device according to claim 33, said semiconductor device is one selected from the group consisting of a personal computer, a video camera, a portable information terminal, a digital camera, a digital video disk player, and an electric game appliance.

25 38. A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor layer comprising a crystalline semiconductor film on an insulating surface;

forming a first insulating film on said semiconductor layer;

forming an electrode and a source wiring on said first insulating film, said electrode overlapping a portion of said semiconductor layer;

forming a second insulating film covering at least said electrode and said source

wiring; and

forming a gate wiring connected to said electrode and overlapping a portion of said semiconductor layer, a connection electrode for connecting said semiconductor layer to said source wiring, and a pixel electrode overlapping said source wiring,

5 wherein said gate wiring, said connection electrode, and said pixel electrode are formed on said second insulating film.

10 39. A method of manufacturing a semiconductor device of claim 38, wherein said second insulating film further comprises a lamination film of a first insulating layer made of silicon oxide, silicon nitride or silicon oxynitride and a second insulating layer made of polyimide, acrylic, polyamide, polyimide amide, or benzocyclobutene.

15 40. A method of manufacturing a semiconductor device of claim 38, wherein said semiconductor device is one selected from the group consisting of a personal computer, a video camera, a portable information terminal, a digital camera, a digital video disk player, and an electric game appliance.

20 41. A method of manufacturing a semiconductor device comprising the steps of:
forming a first semiconductor layer and a second semiconductor layer on an insulating surface, each comprising a crystalline semiconductor film;
25 forming a first insulating film on said first and second semiconductor layers;
forming a first electrode overlapping said first semiconductor layer, a second electrode overlapping said second semiconductor layer, and a source wiring on said first insulating film;
forming a second insulating film covering at least said first and said second electrodes and said source wiring; and
25 forming a gate wiring connected to said first electrode and overlapping said first semiconductor layer, a connection electrode for connecting said first semiconductor layer to said source wiring, and a pixel electrode overlapping said source wiring,

wherein said gate wiring, said connection electrode, and said pixel electrode are formed on said second insulating film.

42. A method of manufacturing a semiconductor device of claim 41, wherein said 5 second semiconductor layer connected to said pixel electrode overlaps said second electrode connected to a gate wiring of an adjacent pixel electrode.

43. A method of manufacturing a semiconductor device of claim 41, wherein said second insulating film further comprises a lamination film of a first insulating layer made 10 of silicon oxide, silicon nitride or silicon oxynitride and a second insulating layer made of polyimide, acrylic, polyamide, polyimide amide, or benzocyclobutene.

44. A method of manufacturing a semiconductor device of claim 41, wherein said semiconductor device is one selected from the group consisting of a personal computer, a 15 video camera, a portable information terminal, a digital camera, a digital video disk player, and an electric game appliance.